

Fertility Preservation Methods Improving for Cancer Patients

New Device Shows Promise

By Amr Farouk Abdel Kader, MD

Many young female patients undergo cancer treatments that include adjuvant chemotherapy or radiotherapy. These agents can severely affect fertility potential and future lifestyle as the gonads may be permanently destroyed during the course of treatment. The option of fertility preservation for cancer patients through cryopreservation of the ovaries in whole or in fragments already is available. Preserved ovaries are then either orthotopically or heterotopically transplanted back to the patient after the conclusion of cancer treatment. While this procedure is still experimental, ovarian tissue preservation and transplantation may be a standard patient care procedure in the near future.

During the last decade, our group in the Reproductive Research Center at Cleveland Clinic and others around the world have been pioneering techniques to establish the best methods of cryopreservation and transplantation of ovarian tissue. We initiated this line of research in 2002, and continue to investigate a variety of fertility preservation options.

We have extensively studied ovarian tissue cryopreservation and its effects on oocyte quality. In our initial studies, we established freezing protocols and studied the cryobiology of the oocyte, as well as associated cellular changes and the effects of ischemia and post-transplant responses using animal models (porcine and ovine).

Ongoing research is evaluating a new modality of ovarian tissue cryopreservation that includes ovarian tissue processing followed by vitrification. We are using a

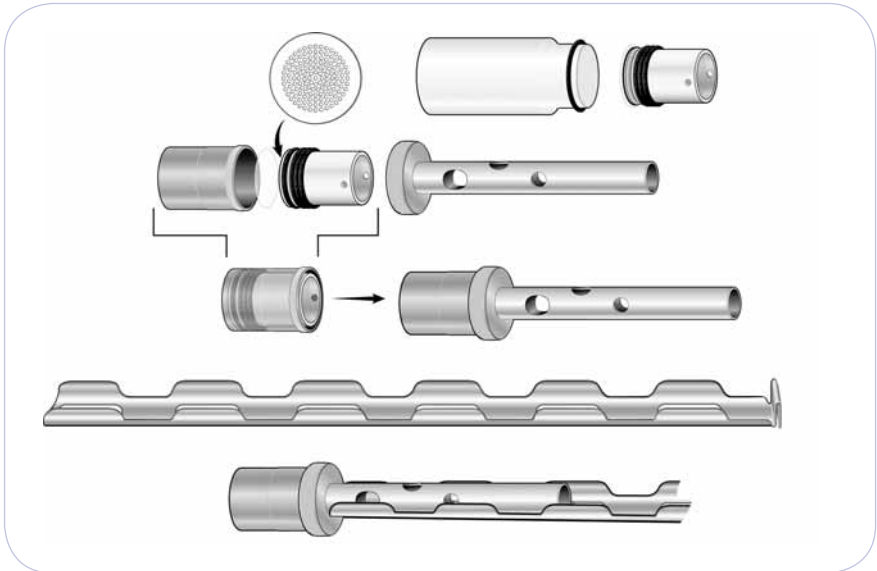
new device developed at Cleveland Clinic specifically for this purpose — “The Ohio Cryo.” Preliminary results of the new method of processed ovarian tissue vitrification using “The Ohio Cryo” show successful recovery of healthy ovarian tissue.

Animal studies using the sheep model also are under way to evaluate transplantation of the ovarian tissue after vitrification. We are adopting a new minimally invasive surgical approach known as the “para-orthotopic laparoscopically assisted ovarian tissue injection transplantation.” This technique promises simplicity; the possibility of dosing the transplant rather than the whole ovary; a near orthotopic site, which may allow spontaneous pregnancy if ovarian functions are adequately resumed; and finally, a rich surrounding vascular bed, which may improve the graft’s initial uptake and survival.

Results from the animal transplantation experiments are not yet available. Further improvements of the methods of delivery of the ovarian tissue also are being investigated to assure the graft has the best possible chance to survive, remains active and begins to ovulate at or near the orthotopic site.

We are optimistic that our ongoing research will result in an easy, quick and effective method to cryopreserve ovarian tissue; provide physicians a simple, minimally invasive technique for ovarian transplantation; and most importantly, provide our patients a safe and reliable fertility preservation option that can be offered before cancer treatment begins. [n](#)

Dr. Kader is a research fellow in the Reproductive Research Center who specializes in assisted reproduction techniques, human gametes cryopreservation and laparoscopic surgery. He can be reached at kadera@ccf.org.



Exploded view of “The Ohio Cryo”